REMARKS

Reconsideration and allowance are requested in view of the above amendments and the following information and discussion.

This Amendment After Final Rejection will also confirm the substance of the July 27, 2007 interview between Examiner Thomas Lithgow, applicant Timothy Stewart and applicant's counsel Thomas A. Hodge.

I. The Rejections Under Section 103(a)

Under 35 U.S.C. 103(a), the Examiner has rejected Claims 1-9 and 11-28 as being unpatentable over Ramirez et al. U.S. Patent No. 4,031,006 in view of Petit et al. U.S. Patent No. 5,766,484. (Applicant notes that Claim 2 is not subject to this rejection.)

Under 35 U.S.C. 103(a), the Examiner has rejected Claim 10 as being unpatentable over the prior art as applied to Claim 7 above, and further in view of Dixon et al. U.S. Patent No. 5,308,499. (Applicant notes that Claims 1-9 and 11-28 are not subject to this rejection.)

These two rejections under Section 103(a) are traversed in view of the following reasons.

The standards and requirements for a proper rejection under Section 103(a) are discussed in the Amendment mailed November 22, 2006 and will be considered as repeated here.

As discussed at the July 27 interview, the Ramirez patent teaches a process which is dependent upon **the use of dissolved air**. However, applicant's process is dependent upon **the use of non-dissolved air**. Specific examples from the Ramirez patent in regard to the use of dissolved air include the following:

(1) At column 1, lines 40-50:

> Therefore, it is an object of this invention to provide an improved method and apparatus for **mixing a raw wastewater with bubbles** to form buoyant agglomerates within the wastewater.
>
> Another object of the present invention is an improved method and means for achieving an improved upwardly directed vortex **mixing of a flowing wastewater with microbubbles** prior to the transmittal of the wastewater flow to a flotation tank wherein buoyant agglomerates of impurities and bubbles may be separated from the wastewater flow.
>
> Still another object of the invention is an improved method and means for coagulating impurities within a flow of wastewater and **mixing these coagulated impurities with microbubbles** to form buoyant agglomerates within a flowing wastewater.
>
> This invention is an improved method and a means for rapidly forming buoyant agglomerates within a flow of wastewater including a tangential inflow to form an upwardly spiraling vortex column of **wastewater in a**

cylindrical chamber positioned above a dense supply of bubbles....

(Emphasis added.)

(2) At column 3, lines 44-50:

The bubbles that are supplied by the bubble introducing zone below the vortex column rise into the vortex column. **Since the bubbles are significantly less dense than either the wastewater or the wastewater impurities**, they tend to migrate toward the axis of the vortex column and flow therethrough to assist in the formation of the central core of the vortex column....

(Emphasis added.)

(3) At column 5, lines 38-62:

The very fine bubbles needed for this process may be generated electrolytically, through gas dispersion or dissolution, or by a combination of electrolytic generation and gas dispersion or dissolution. Gas dispersion or dissolution methods can bring with them the advantages of being less expensive than electrolytically generated bubbles and of supplying a bubble source having substantial swirling or turbulence features to enhance the mixing the bubbles and pollutants in the vortex column. **Irrespective of how the bubbles are actually formed, dense clouds of very fine bubbles are introduced into the bubble**

> **introducing zone below the votex column so as to form the dense supply of microbubbles. The bubbles should range in diameter size from about 10 to 500 microns, preferably 20 to 300 microns, and ideally 30 to 150 microns.** The dense supply of these bubbles should include about 10^6 to 10^8 bubbles per liter and account for about 0.1 to 10 volume percent of the wastewater flowing through the vortex column. If the conductivity (primarily a concern in electrolytic generation) and/or the surface tension (primarily a concern in gas dispension) of a particular wastewater **are not adequate to supply bubbles within the size and density parameters, then ionic species and/or surfactants should be added.**
> (Emphasis added.)

The Ramirez patent teaches that, if the required bubble densities are not achieved, the removal of impurities will be "severely lessened". Specifically at column 9, lines 4-10, the patent teaches:

> ....At this surface tension range, the required bubble densities within means 61 can be achieved even when dispersion techniques only are used. These densities generally range from about 5 to about 20 volume percent bubbles, however incorporated within means 61. **If these densities are not achieved, the removal of impurities will be severely lessened....**
> (Emphasis added.)

Based upon the teachings of the Ramirez patent, **the use of dissolved air** is clearly required in the process of this patent.

As will be seen from the claims of this application, applicant's process is dependent upon **the use (i.e., injection) of non-dissolved air**. In this regard, Claim 1 and 17 of this application recite that the non-dissolved air is injected into the recycled waste water.

To further emphasize applicant's use of non-dissolved air, Claims 1 and 17 are amended to incorporate the subject matter of original Claims 16 and 28, respectively. These amendments recite that the waste water of applicant's process is recycled by "a pump which operates at a pressure below the pressure required to dissolve the air". Accordingly, original Claims 16 and 28 are cancelled.

In summary, the Ramirez patent clearly teaches the use of dissolved air, which is directly contrary to applicant's use of non-dissolved air. The Ramirez patent **teaches away** from applicant's process and, therefore, should be removed as a reference under Section 103(a).

The teaching of the Petit patent is directed to a flotation system which is dependent upon the use of dissolved gas. In fact, the title of this patent is "Dissolved Gas Flotation Device".

At column 1, lines 4-7, the Petit patent teaches:

> The present invention relates to wastewater treatment tanks utilizing **dissolved gas flotation technology** to separate flocculated solids or immiscible liquid from a contaminated air.... (Emphasis added.)

Throughout the Petit patent, the term DGF is used to refer to "dissolved gas flotation"; for example, refer to column 1, line 11.

At column 2, lines 5-10, the Petit patent teaches:

> The invention is premised on the recognition that the most ideal situation for DGF separation of contaminants from liquid would be in a batch DGF reactor where there would be no downward flow of liquid. **The bubbles would rise** to the surface uniformly and separate contaminants from the liquid....
> (Emphasis added.)

In summary, the Petit patent teaches the use of dissolved gas, which is directly contrary to applicant's use of non-dissolved air. The Petit patent **teaches away** from applicant's process and, therefore, is not a proper reference under Section 103(a).

The teaching of the Dixon patent is directed to an effluent treatment process which employs the principles of **dissolved air flotation**. At column 3, lines 26-30, this patent teaches:

> The term "flotation" as used herein refers to the technique in which air is passed through the effluent mixture and **air bubbles becomes attached** to surfactant-treated, flocculated organic material which then rises to the surface of the effluent water.
> (Emphasis added.)

Further, at the end of Claim 1, the Dixon patent recites "by flotation comprising passing air bubbles through the effluent."

In summary, the Dixon patent teaches the use of dissolved air, which is directly contrary to applicant's use of non-dissolved air. The Dixon patent **teaches away** from applicant's process and, therefore, should be removed as a reference under Section 103(a).

Based upon the above reasoning and amendments to Claims 1 and 17, applicant submits that the present invention is not rendered obvious by the Ramirez patent in combination with either or both of the Petit and Dixon patents. Consequently, these two rejections under Section 103(a) should be withdrawn.

II. The Examiner's Statement Regarding Non-Dissolved Air

On page 3 of the May 12 Office Action, the Examiner states:

> "It is axiomatic that a 'dispersed' air stream in water is at least in part 'non-dissolved' as recited in the claims. As such, the limitation is expressly taught by Ramirez '006..."

While this statement may or may not be accurate, applicant emphasizes that the effectiveness of the Ramirez process is **dependent on the use of dissolved air**. In fact, as quoted above, if the dissolved air parameters are not achieved, the removal of impurities by the Ramirez process **will be severely lessened**; refer to column 9. The Ramirez patent is directed to a process **which uses dissolved air** and fails to teach the use of non-dissolved air.

To the contrary, the effectiveness of applicant's process is directed to the use (i.e., injection) of non-dissolved air; refer to currently amended Claims 1 and 17. Applicant's use of non-dissolved air is an essential feature not taught by the Ramirez, Petit or Dixon patents.

In view of the above information, discussion and amendments, applicant maintains that this application is in condition for allowance, which action is requested.

Respectfully submitted,

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